

will yield positive results. The long barren channel preceding this detached nebula (only part of which is visible on the scale of this plate) is a very curious feature, and offers an inviting field for speculation.

Starfield Observatory, Crowborough Beacon.

Dark Nebulosities. By W. S. Franks.

From time to time it has been hinted in a vague manner that, besides the ordinary self-luminous nebulosity, there exist in space certain forms of *non-luminous* nebulous matter, but, so far as I know, nothing definite has been advanced to account for such a phenomenon. However, that it does exist there can be little doubt after examining the evidence ; I propose, therefore, to mention certain objects which exhibit this curious appearance. During the course of a considerable experience in nebular photography I have met with not a few of such, but have merely selected four of them as being good typical examples. As will be seen from the illustrations figs. 1, 2, and 3 belong to the "ray"-like nebulae, of which so many were detected by Lord Rosse ; they are generally lenticular in section, and in all probability are spirals seen edgewise. A considerable proportion of these are characterised by a *dark* line or stripe along the major axis, apparently dividing the nebula into two parts parallel to each other. What is the cause of this appearance ? That it is due to a real division of the nebula is almost inconceivable. It must be, I venture to assert, because the outer and attenuated edge of the nebula has cooled down so rapidly, relatively to the central hot and luminous mass, that where it crosses the latter (as it would do in an edgewise view) it simply stops its light by absorption and produces a dark band. I call it "dark" nebulosity advisedly, for it is really *darker* than the surrounding sky. This is even more strikingly seen on the negative (where it is, of course, *lighter* than the sky background). Its effect on the photographic plate is as though a screen were interposed between it and the sky, to stop the diffused light which always fogs the plate in a degree proportional to the length of exposure. In fig. 4 we have a modification of the usual form, the section being that of a double concave lens ; but the dark band is there also, probably because the feeble outer nebulosity is densest along its centre. Possibly, too, some of the peculiar dark gaps which are shown in certain nebulae of irregular form may be in reality enormous real extensions in the line of sight of feebler and cooler nebulosity which intercept the light behind. [The figures are all to one scale : $1^{\text{mm}} = 12'' \pm$ of arc.]

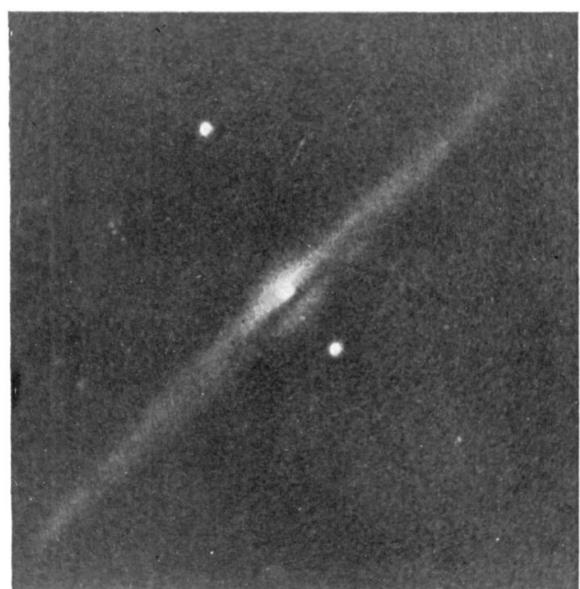
Starfield Observatory, Crowborough Beacon.

Fig. 1.



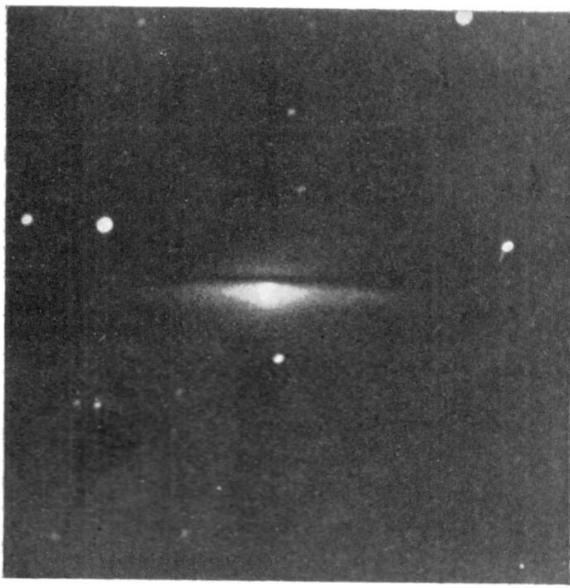
B V 19 Andromedæ.

Fig. 2.



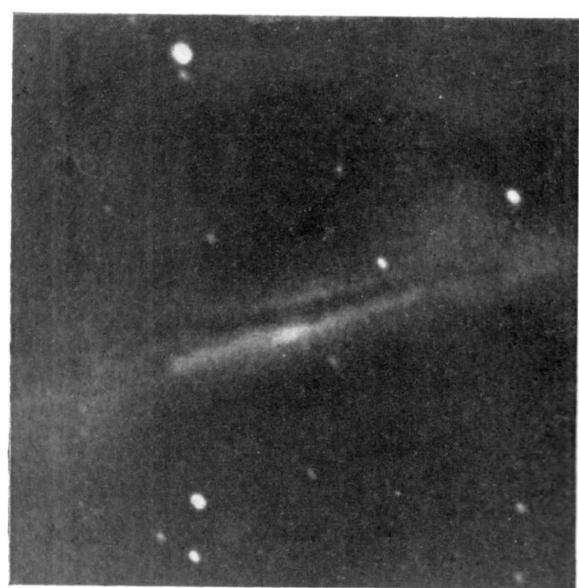
B V 24 Comæ.

Fig. 3.



B I 43 Virginis.

Fig. 4.



B V 8 Leonis.

EXAMPLES OF DARK NEBULOSITIES.

Photographed by W. S. Franks.

Dec. 1904. *Mr. Wickham, Decline of Visual Magnitude, etc.* 161

*On the Decline of the Visual Magnitude of Variable 159.
1904 Pegasi as observed at the Radcliffe Observatory, Oxford.
By Walter Wickham.*

The *Zirkular Nr. 68 der Zentralstelle*, announcing the discovery by Mr. A. Stanley Williams of an apparently new star preceding B.D. $29^{\circ}4655$, was received at Oxford on October 8, and the same evening the star was found in the place indicated, using the Barclay 10-inch equatorial.

The following four B.D. stars are conveniently situated for comparison, but are so nearly of an equal magnitude that it has not been easy to formulate a descending scale from them. The magnitudes here set down are those of (1) the original B.D., (2) the Cambridge (England) zone of the A.G.C., (3) my own readjustment of the values after careful comparisons on October 8, 11, 13, 18.

	B.D.	Camb. A.G.C.	Radcl. 1904.
B.D. + 29°4659	8.8	9.0	9.11
·4652	8.9	8.9	8.91
·4653	9.2	9.1	8.79
·4655	9.1	9.1	9.01

The whole of the field was surveyed and provisional magnitudes assigned to about twenty of the fainter stars, extending the Argelander scale in descending steps by extrapolation. The results for the Stanley Williams star were :

	Oct. 8.	Oct. 11.	Oct. 13.	Oct. 18.	
from	9.48	9.53	9.48	9.41	
	(8)	(10)	(11)	(22)	comparison stars.

The close agreement of these values showed that there was very little, if any, change in magnitude. This conclusion was confirmed in *Ast. Nach.* 3971, 174-6 by Professor Pickering's telegram of October 7, "Williams star, long period variable, considered by spectrum," and by the notification of October 8 from Herr P. Gotz, Astrophysical Observatory, at Königstuhl, that on August 6-8 the star was nearly of the same magnitude as B.D. + 29°4653 (9.2 mag.). In *Ast. Nach.* 3973, 207-8, there appeared a note from Professor E. C. Pickering, "The Harvard photographs show that this object has existed for several years and is variable." Professor Max Wolf has published a chart of the region of the variable in *Ast. Nach.* 3977, 267-8, but does not mention the brightness, either visual or photographic, of the star on October 9, when the photograph was taken from which is reproduced the sketch he publishes.

The whole staff of this Observatory being engaged in other work of a routine character, and the clear nights so rare, no further attention could be given to this star until December 3,